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ABSTRACT

This document is the fall and spring semester course syllabus of Biology 242--Human Anatomy at Southern University (Louisiana). Sections include: (1) Descriptive Information; (2) Specification of Course Goals and Objectives; (3) Readings; (4) Description of Instructional Procedures; (5) Course Requirements; (6) Course Schedule; (7) Evaluation of Students and Grading System; and (8) Orientation and Introduction to Anatomical Terminology. The following systems are covered in a complete class outline: (1) Integumentary; (2) Skeletal; (3) Joints; (4) Muscular; (5) Nervous; (6) Eye and Ear; (7) Respiratory; (8) Blood; (9) Cardiovascular; (10) Lymphatic; (11) Digestive; (12) Urinary; (13) Reproductive; and (14) Endocrine. (YDS)

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ED 443 714

DEPARTMENT OF BIOLOGICAL SCIENCES

A Syllabus for

BIOL 242 - HUMAN ANATOMY

JANUARY 2000

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BIOLOGY 242 — HUMAN ANATOMY

FALL AND SPRING SEMESTER

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By Appointment

The Moving Finger writes; and, having writ,
Moves on; nor all your Piety nor Wit
Shall lure it back to cancel half a line,
Nor all your Tears wash out a Word of it.

The Rubaiyat of Omar Khayyam

BIOLOGY 242 - HUMAN ANATOMY

COURSE SYLLABUS

TABLE OF CONTENTS

DESCRIPTIVE INFORMATION iii

SPECIFICATION OF COURSE GOALS AND OBJECTIVES iii

READINGS iv

DESCRIPTION OF INSTRUCTIONAL PROCEDURES iv

COURSE REQUIREMENTS iv

COURSE SCHEDULE viii

EVALUATION OF STUDENTS AND GRADING SYSTEM viii

ORIENTATION AND INTRODUCTION TO ANATOMICAL TERMINOLOGY 1

INTEGUMENTARY SYSTEM 7

SKELETAL SYSTEM 10

JOINTS 23

MUSCULAR SYSTEM 25

NERVOUS SYSTEM 37

EYE AND EAR 56

RESPIRATORY SYSTEM 63

BLOOD 68

CARDIOVASCULAR SYSTEM 70

LYMPHATIC SYSTEM 79

DIGESTIVE SYSTEM 81

URINARY SYSTEM 89
REPRODUCTIVE SYSTEM 93
ENDOCRINE SYSTEM 97

BIOLOGY 242 - HUMAN ANATOMY

I. DESCRIPTIVE INFORMATION

BIOL 242 Human Anatomy (credit, 4 hours) - An introductory course in a study of gross anatomy of the various systems of the body, including the digestive system, respiratory system, urinary system, nervous system, muscular syste , skeletal system, cardiovascular system, blood and lymph, skin, eyes, and ear. Designed for students majoring in nursing education, medical technology, physical therapy, occupational therapy, and nutrition. Prerequisites: none.

II. SPECIFICATION OF COURSE GOALS AND OBJECTIVES

A. Statement of General Goal - The primary goal of the course is to provide the student with the knowledge base which the student needs to perform the six terminal objectives stated below when the student has completed the course of study at the University.

TERMINAL OBJECTIVES:

1. Given a publication in the nursing, nutrition, rehabilitation, or medical literature, read, interpret, and critically analyze the publication relative to the anatomical considerations presented therein.

2. Given a patient and a patient treatment plan, identify the anatomical considerations in patient management before treatment initiation and the possible changes following successful treatment.

3. Given a patient and a diagnosis, describe the anatomical considerations relating to the diagnosis to include the normal anatomy and the abnormal anatomy associated with the diagnosis.

4. Given a patient at risk for a given disease, instruct the patient on the normal anatomy and the abnormal anatomy as a basis for implementing a personal program of preventive medical care.

5. Given a topic, develop a lesson plan, to include relevant normal and abnormal anatomy, for presentation in a in-service training program for para-professional medical personnel.

6. Given a patient's medical records, identify the anatomical considerations that influence determinations associated with risk management, quality control, and cost assessment as related to the care provided to that patient.

B. Statement of Course Objectives - Specific course behavioral objectives are given at the beginning of each topic

III. READINGS:

A. Required Textbook: Tortora, Gerald J. and Grabowski, Sandra Reynolds, *Principles of Anatomy and Physiology*, 9th ed., John Wiley & Son, Inc., 2000

B. Required Laboratory Manual: None

IV. DESCRIPTION OF INSTRUCTIONAL PROCEDURES:

Course material will be presented by a variety of methods. The lecture will be the primary vehicle used to present instruction along with laboratory exercises to illustrate, clarify, and reinforce lecture presentations. Discussion/recitations will be used to facilitate development of the student's ability to critically analyze data, construct reasonable conclusions, and assimilate new information. Oral presentations by students will also be utilized.

V. COURSE REQUIREMENTS:

A. Examinations:

1. Four (4) examinations will be administered during the laboratory period. Each examination will have a written component and a practical component. Each examination will test for information not previously tested.

2. An additional final examination will be comprehensive. The final examination will be administered during the designated time for the lecture period.

3. Examinations will test for all information presented in lecture, laboratory, homework assignments, and reading assignments to include the sections of the textbook labelled "Exhibits", "Clinical Application", and "Disorders: Homeostatic Imbalance."

B. Additional Courses Requirements:

1. Additional course requirements for Biology 242, Human Anatomy will include the following written reports and oral presentations: an autobiography; two case studies; and a written report based upon the terminal objectives.

2. Guidelines for Written Requirements

a. All written assignments will be typed double spaced. Margins will be one (1) inch from the right and left and bottom. The type size will be pica or elite (10 or 12 pitch). The title will be centered on the sixth line from the top of the page and the first line of the body will begin on the eighth line of the page indented five (5) spaces from the left margin. A full typed page will contain 26 lines (25 lines on the first page excluding the title). If the written assignment is prepared using a word processor, it will be printed double spaced. Margins will be one (1) inch from the top, right, left and bottom. The font size will be 10 or 12 points and the font type will be Arial (Helvetica), Times New Roman, Courier, or other standard font. The title will be centered at the top of the page and the first line of the body will begin on the first double-spaced line following the title.

b. No written assignment will be accepted after 9:00 a.m. on the day following the due date for that assignment. Exceptions will be granted only to those students who present a valid excuse for failure to meet the assignment deadline.

3. Autobiography

a. The autobiography will be at least one (1) full, typed page long.

b. The autobiography will address the following topics:

(1) Personal information (name, classification, hometown, major, special information);

(2) "What I hope to get out of Biology 242" (i.e. "What I hope to learn in the course" and "What grade do I hope to earn in the course").

(3) Any additional information which the student wishes to include to meet the minimum length requirement stated above.

4. Anatomical Case Studies

a. Anatomical case studies will be assigned for oral presentation to the class as a group activity. Two (2) case studies will be assigned to each group.

b. Four (4) examination questions will be prepared and turned in by each group at the time of the oral presentation of each case study. Two (2) multiple choice questions and two (2) K-format questions will be turned in.

c. Grading of the case studies will be based on the oral presentation of each case study. One score will be assigned to each group and each group member will receive the same grade.

d. Individual members will not be permitted to read their oral presentations.

4. Written Report

a. A written report based upon Course Terminal Objectives No. 5 will be submitted in accordance with the prescribed format. A written report based on either of the other five terminal objectives may be submitted as a substitute if the prior approval has been given by the instructor.

b. Individual students may be selected by the instructor to make an oral presentation of their respective written reports to the class.

C. Class Attendance:

1. The following is taken from the 1998-2000 edition of the Southern University Catalog, page 22

"Students are required to attend classes regularly and punctually, as a minimum academic obligation. Failure to observe this policy may seriously jeopardize a student's academic standing. Tardiness and excused absences should be brought to the attention of the instructor(s) by the student. The following class attendance policies apply:

- A student required to be absent from class because of illness or other unavoidable circumstances should promptly report the reasons to the instructor and, if required, present excuses. The instructor should make clear to the student that excuses explain absences, but do not remove them. If the number of absences places the student's academic status in jeopardy, the student's dean should be notified by the instructor, excuses notwithstanding.

- Students are required to adhere to attendance policies established by their colleges and stated by the instructors on the course syllabi.
- Excuses for participation in University-sponsored activities will be initiated by the sponsoring unit and approved by the college dean and the Office of Academic Affairs.
- Students who which to be absence from classes for reasons not covered by these regulations must apply to their department for a leave of absence. All excuses or explanations must be submitted in writing to the student's department head within three school days after the student returns to classes.

2. Regular and prompt attendance of class is an absolute requirement for successfully completing the course. Any student who accumulates four (4) combined absences in the lecture plus the laboratory will be given a 50% reduction in course bonus points. Any student who accumulates six (6) combined absences in the lecture plus the laboratory will be given a 75% reduction in course bonus points. Any student who accumulates eight (8) combined absences in the lecture plus the laboratory will be ineligible to receive any course bonus points. Each additional absence beyond eight (8) will result in a decrease in the total course score by ten (10) points. Any student who presents a validated excuse for an absence from class due to participation in a University-sponsored activity will not have points deducted for the absence connected to that activity. Points will be deducted for all other absences whether excused or not. It is the responsibility of the student to find out what occurred in class and to make up any work missed during an absence. Make-ups will not be given for unannounced quizzes. No make-ups will be given for unexcused absences.

VI. COURSE SCHEDULE:

The schedule for examinations and other course requirements for a Fall or Spring Semester follows:

Week 1	Autobiography	
Week 2	Quiz	Terminology
Week 3	Examination #1	Orientation and Introduction to Anatomical Terminology; Integumentary System; Skeletal System; Joints
Week 6	Examination #2	Muscular System
Week 9	Examination #3	Nervous System; Eye and Ear
Week 11	Written Report	Based on Terminal Objectives
Week 12	Examination #4	Respiratory System; Blood; Cardiovascular System; Lymphatic System
To Be Announced	Case Reports	Based on assigned case studies
Week 15	Final Examination for Graduating Seniors	All material covered in the course
Week 16	Final Examination	All material covered in the course (information tested on Examinations 1-4 plus Digestive System; Urinary System; Reproductive System; Endocrine System

VII. EVALUATION OF STUDENTS AND GRADING SYSTEM:

A. The course grade will be based upon examination scores, quiz scores, and writing assignments. The total points available from examinations, quizzes, and writing assignments will represent 100% and will become the basis for assigning the final grade for the course. The final grade will be assigned in accordance with the grading scale listed below.

B. Bonus points are not included in the total points available for the course. Bonus points earned by each student will be added to the student's total points and used to calculate that student's final grade.

C. Course Points Distribution:

1. Examinations ---------- 990 Points

   a. Course Examinations ---------- 900 points
      (1) Examination No. 1 -- 150 points
      (2) Examination No. 2 -- 150 points
      (3) Examination No. 3 -- 150 points
      (4) Examination No. 4 -- 150 points
      (5) Final Examination -- 300 points

   b. Quizzes ---------- 90 points
      (1) Terminology Quiz -- 50 points
      (2) Other quizzes -- 40 points

2. Additional Requirements ---------- 210 Points
   a. Autobiography -- 10 points
   b. Case Study No. 1 -- 50 points
   c. Case Study No. 2 -- 50 points
   d. Written Report -- 100 points

3. Total Points Available ---------- 1200 Points

4. Bonus Points ---------- 60 Points
   a. Laboratory activities -- 20 points
   b. Examinations -- 16 Bonus Points
   c. Tracings -- 24 Bonus Points

D. GRADING SCALE:

A = 90.0 - 100 (percent of total available points; 1080 - 1200)
B = 80.0 - 89.9 (960 - 1079)
C = 70.0 - 79.9 (840 - 959)
D = 60.0 - 69.9 (720 - 839)
F = 0.0 - 59.9 (0 - 719)

ORIENTATION AND INTRODUCTION TO ANATOMICAL TERMINOLOGY

OBJECTIVES:

1. Describe the anatomical position and explain its significance in the study of anatomy.
2. Given the name of a structure in the body, use the appropriate anatomical terms to describe its location in the body and its relationships.
3. Name and describe the planes of the body.
4. Name and describe the regions of the body.
5. Discuss the regions and quadrants of the abdomen.
6. Define each of the following terms: cell, tissue, organ, system, organism.
7. Discuss the structure and function of the cell to include its parts, the structure of each part, and the functions of each part.
8. Discuss the tissues of the body to include the classes of tissue, the functions of each class of tissue, the types in each class, and examples of each type.
9. Discuss the types of membranes found in the body and give examples of each type of membrane.
10. Given a model or diagram of a cell, identify each of the parts of the cell.

REFERENCE: Tortora and Grabowski, Chapter 1; Chapter 3, pages 60-86, 95-96; Chapter 4.

Introduction to Medical Terminology; A Programmed Text

Class Outline

I. Anatomical Terminology

- A. Anatomical Position
- B. Directional and Relational Terms
  1. Anterior (Ventral)

2. Posterior (Dorsal)

3. Superior

4. Inferior

5. Medial

6. Lateral

7. Ipsilateral

8. Contralateral

9. Proximal

10. Distal

11. Superficial

12. Deep

13. Parietal

14. Visceral

C. Body Motions

1. Abduction

2. Adduction

3. Flexion

4. Extension

5. Pronation

6. Supination

7. Circumduction

8. Dorsiflexion

9. Plantar Flexion

10. Inversion

11. Eversion

C. Body Planes

1. Sagittal

2. Frontal (Coronal)

3. Transverse (Horizontal)

D. Body Regions

1. Cephalic

2. Cervical

3. Thoracic

4. Back

5. Abdomen

a. Abdominal Regions

(1) Epigastric

(2) Hypochondriac

(3) Umbilical

(4) Lumbar

(5) Hypogastric (Pubic)

(6) Iliac (Inguinal)

b. Abdominal Quadrants

6. Pelvis

7. Perineal

8. Axillary

9. Brachial

10. Antecubital

11. Antebrachial

12. Carpal

13. Manual (Hand)

14. Femoral

15. Patellar

16. Popliteal

17. Crural

18. Pedal (Foot)

II. Organization of the Body

A. Cell

1. Definition

2. Structure

a. Cell (Plasma) Membrane

b. Organelles

(1) Nucleus

(2) Mitochondria

(3) Ribosomes

(4) Endoplasmic Reticulum

(5) Golgi Complex (Bodies)

(6) Lysosomes

(7) Centrioles

(8) Cytoskeleton

c. Cytosol (Cytoplasm)

B. Tissue

1. Epithelial

a. Classification by Shape

(1) Squamous

(2) Columnar

(3) Cuboidal

(4) Transitional

b. Classification by Layers

(1) Simple

(2) Stratified

(3) Pseudostratified

2. Connective

a. Connective Tissue Proper

b. Bone

c. Cartilage

d. Blood

3. Muscle

a. Skeletal

b. Smooth

c. Cardiac

4. Nervous

a. Neuron

b. Neuroglia

5. Membranes

a. Epithelial

(1) Serous

(a) Pleura

(b) Pericardium

(c) Peritoneum

(2) Mucous

b. Connective

(1) Synovial Membrane

(2) Dura Mater

C. Organ

D. System

INTEGUMENTARY SYSTEM

OBJECTIVES:

1. Discuss the functions of the integumentary system.
2. Name and describe the layers of the skin.
3. Define superficial fascia and describe its structural and functional relationships to the skin.
4. Name and describe the appendages of the skin to include the structure, location, and function of each appendage.
5. Discuss the skin receptors to include the name, location, and function of each receptor.
6. Given a model or diagram of the skin, identify each of the layers of the skin and the components of each layer.

REFERENCE: Tortora and Grabowski, Chapter 5; Chapter 15, pages 486-490.

Class Outline

I. Skin

- A. Epidermis
  - 1. Stratum Germinativum (Basale)
  - 2. Stratum Spinosum
  - 3. Stratum Granulosum
  - 4. Stratum Lucidum
  - 5. Stratum Corneum
- B. Dermis
  - 1. Dermal Papillae
  - 2. Vascularity

3. Innervation

II. Superficial Fascia (Subcutaneous layer)

III. Skin Appendages

A. Hair

1. Shaft

2. Root

3. Follicle

a. Bulb

b. Papilla

4. Arrector pili

B. Nails

C. Glands

1. Sebaceous

2. Sudoriferous

a. Eccrine

b. Apocrine

c. Modified Sudoriferous Glands

(1) Ceruminous Glands

(2) Mammary Glands

IV. Skin (Cutaneous) Receptors

A. Classes of Skin Receptors

1. Mechanoreceptors
2. Thermoreceptors
3. Nociceptors

B. Types of Skin Receptors

1. Merkel's Disc
2. Meissner's Corpuscle
3. Ruffini End Organ
4. Pacinian Corpuscle
5. Hair Root Plexus
6. Free Nerve Ending

SKELETAL SYSTEM

OBJECTIVES:

1. Name and describe the types of bone.
2. Discuss the structure of bone to include the parts of a typical long bone and the functions of each part.
3. Name and describe the types of bone cells.
4. Discuss, using diagrams and labels, the osteon.
5. Describe the structure of a typical vertebra to include diagrams and labels.
6. Discuss the organization of the skeletal system to include the divisions of the skeleton, the bones in each, and the location and function of each bone.
7. Describe the surface features of each of the bones in the axial amd appendicular skeleton.
8. Given a specimen, model, or diagram of the skeleton, identify each of the bones.

REFERENCE: Tortora and Grabowski, Chapters 6, 7 and 8.

Class Outline

I. Functions of the Skeletal System

II. Types of Bone

- A. Long
- B. Short
- C. Flat
- D. Irregular
- E. Sesamoid

III. Surface Features of a Bone

A. Depressions and Openings

1. Fissure
2. Fossa
3. Fovea
4. Foramen
5. Meatus
6. Sulcus (groove)

B. Processes that Form Joints

1. Condyle
2. Facet
3. Head

C. Processes for Attachments

1. Crest
2. Epicondyle
3. Line
4. Tubercle
5. Tuberosity
6. Trochanter
7. Spine (Spinous Process)

IV. Structure of Bone

A. Parts of a Typical Long Bone

1. Epiphysis
2. Diaphysis
3. Articular Cartilage
4. Periosteum
5. Compact Bone
6. Cancellous (Spongy) Bone
7. Endosteum
8. Medullary Canal
9. Bone Marrow

B. Types of Cells

1. Osteoblasts
2. Osteocytes
3. Osteoclasts

C. Osteon (Haversian System)

1. Central (Haversian) Canal
2. Perforating (Volkmann's) Canal
3. Concentric Lamellae
4. Lacunae
5. Canaliculi

D. Trabeculae

V. Divisions of the Skeleton

A. Axial

B. Appendicular

VI. Bones of the Axial Skeleton

A. Skull

1. Cranium

a. Frontal

(1) Squama

(2) Supraorbital Margin

(3) Supraorbital Notch (Foramen)

(4) Glabella

b. Parietal

c. Temporal

(1) Mastoid Process

(2) External Auditory (Acoustic) Meatus

(3) Mandibular Fossa

(4) Styloid Process

(5) Zygomatic Process

d. Occipital

(1) Foramen Magnum

(2) Condyles

(3) External Occipital Protuberance

(4) Superior Nuchal Line

(5) Inferior Nuchal Line

e. Sphenoid

(1) Body

(2) Greater Wing

(3) Lesser Wing

(4) Sella Turcica

(5) Pterygoid Process

(6) Superior Orbital Fissure

f. Ethmoid

(1) Cribriform Plate

(2) Crista Galli

(3) Perpendicular Plate

(4) Superior nasal Conchae

(5) Middle Nasal Conchae

2. Face

a. Nasal

b. Maxillae

(1) Alveoli

(2) Alveolar Process

(3) Palatine Process

(4) Lacrimal Groove

(5) Incisive Foramen

c. Zygomatic

(1) Temporal Process

(2) Infraorbital Margin

d. Mandible

(1) Body

(a) Alveoli

(b) Alveolar Process

(c) Mental Foramina

(2) Angle

(3) Rami

(a) Condyloid (Condylar) Process

(b) Coronoid Process

(c) Mandibular Notch

(d) Mandibular Foramina

e. Lacrimal

f. Palatine

g. Inferior Nasal Conchae

h. Vomer

3. Hyoid Bone

a. Body

b. Greater Cornu

c. Lesser Cornu

B. Vertebral Column

1. Structure of a Typical Vertebra

a. Body

b. Vertebral Arch

(1) Laminae

(2) Pedicles

(3) Vertebral Foramen

(4) Intervertebral Foramen

(5) Spinous Process

(6) Transverse Processes

(7) Articular Processes

2. Vertebral Canal

3. Bones of the Vertebral Column

a. Cervical

(1) Atlas

(2) Axis - Dens (Odontoid Process)

(3) Vertebra Prominens

b. Thoracic

c. Lumbar

d. Sacral

(1) Sacral Promontory

(2) Median Sacral Crest

(3) Transverse Lines (Ridges)

(4) Sacral Foramina

e. Coccygeal

4. Intervertebral Discs

C. Thorax

1. Sternum

a. Manubrium

(1) Suprasternal (Jugular) Notch

(2) Clavicular Notches

(3) Sternal Angle (of Louis)

b. Body

c. Xiphoid Process

2. Costal Cartilages

3. Ribs

a. Structure of a Typical Rib

(1) Head

(2) Neck

(3) Tubercle

(4) Body (Shaft)

(a) Costal Angle

(b) Costal Groove

b. Classification of Ribs

(1) True

(2) False

(3) Floating

VII. Bones of the Appendicular Skeleton

A. Pectoral Girdle

1. Clavicle

a. Acromial Extremity

b. Conoid Tubercle

c. Costal Tuberosity

d. Sternal Extremity

2. Scapula

a. Borders

(1) Superior

(2) Lateral (Axillary)

(3) Medial (Vertebral)

b. Body

c. Spine

d. Acromion Process

e. Coracoid Process

f. Glenoid Cavity (Fossa)

g. Superior Angle

h. Inferior Angle

B. Upper Limb

1. Humerus

a. Head

b. Anatomical neck

c. Surgical Neck

d. Greater Tubercle

e. Lesser Tubercle

f. Deltoid Tuberosity

g. Medial Epicondyle

h. Lateral Epicondyle

i. Olecranon Fossa

2. Ulna

a. Olecranon Process

b. Coronoid Process

c. Trochlear (Semilunar) Notch

d. Radial Notch

e. Head

f. Styloid Process

3. Radius

a. Head

b. Neck

c. Radial Tuberosity

d. Styloid Process

4. Carpus

a. Scaphoid

b. Lunate

c. Triquetrum

d. Pisiform

e. Trapezium

f. Trapezoid

g. Capitate

h. Hamate

5. Metacarpus

6. Phalanges

C. Pelvic Girdle

1. Coxal (Hip) Bone

a. Ilium

(1) Iliac Crest

(2) Superior Iliac Spine

(3) Inferior Iliac Spine

(4) Greater Sciatic Notch

(5) Iliac Fossa

b. Ischium

(1) Ischial Spine

(2) Lesser Sciatic Notch

(3) Ischial Tuberosity

(4) Ramus

c. Pubis

(1) Superior Ramus

(2) Inferior Ramus

2. Acetabulum

3. Obturator Foramen

4. Symphysis Pubis

D. Lower Limb

1. Femur

a. Head

b. Neck

c. Greater Trochanter

d. Lesser Trochanter

e. Linea Aspera

f. Lateral Condyle

g. Medial Condyle

h. Lateral Epicondyle

i. Medial Epicondyle

2. Patella

a. Base

b. Apex

c. Articular facets

3. Tibia

a. Lateral Condyle

b. Medial Condyle

c. Tibial Tuberosity

d. Medial Malleolus

e. Fibular Notch

4. Fibula

a. Head

b. Lateral Malleolus

5. Tarsus

a. Calcaneus

b. Talus

c. Navicular

d. Cuboid

e. Cuneiforms

(1) Medial (First)

(2) Intermediate (Second)

(3) Lateral (Third)

6. Metatarsus

7. Phalanges

JOINTS

OBJECTIVES:

1. Discuss the classification of joints according to structure and according to function.

2. Describe and diagram the structure of a typical synovial joint to include the function of each part.

3. Discuss the functional classes of joints to include the types of joints in each class, the kind of motion permitted by each type of joint, and examples of each type of joint.

4. Given a specimen, model, or diagram of the body or skeleton, identify each joint to include its classification and the type of motion it permits.

REFERENCE: Tortora and Grabowski, Chapter 9.

Class Outline

I. Classes of Joints

- A. Structural Classes
  - 1. Fibrous
  - 2. Cartilaginous
  - 3. Synovial
    - a. Articular Capsule
      - (1) Fibrous Capsule
      - (2) Synovial Membrane
    - b. Synovial Cavity
    - c. Articular Cartilage
    - d. Ligaments

e. Articular Discs (Menisci)

B. Functional Classes

1. Synarthrosis

2. Amphiarthrosis

3. Diarthrosis

a. Ball and Socket

b. Hinge

c. Gliding

d. Pivot

e. Saddle

f. Ellipsoidal

II. Survey of Principal Joints

A. Cervical Spine

B. Shoulder

C. Wrist

D. Hip

E. Knee

F. Ankle

MUSCULAR SYSTEM

OBJECTIVES:

1. Discuss the microscopic anatomy of skeletal muscle to include the structure of the muscle fiber and its associated connective tissue investments.

2. Discuss the organization of a skeletal muscle as it relates to the arrangement of fascia, the blood supply, and the nerve supply.

3. Discuss the structure and function of the neuromuscular junction.

4. Discuss the organization of the skeletal muscles as it relates to the forms, attachments, and group actions of muscles.

5. Discuss the system for naming skeletal muscles.

6. Name and describe each of the principal skeletal muscles of the body to include location, attachments, and action(s) of each muscle.

7. Given a model or diagram of a muscle fiber, identify each of its components.

8. Given a model or diagram of a neuromuscular junction, identify each of its components.

9. Given a specimen, model, or diagram of the skeletal muscles of the body, identify each muscle to include its name, attachments, and action(s).

REFERENCES: Tortora and Grabowski, Chapters 10 and 11.

Class Outline

I. Microscopic Anatomy of Skeletal Muscle

   A. Muscle Fiber (Myofiber)

      1. Sarcolemma

      2. Sarcoplasm

      3. Sarcoplasmic Reticulum

      4. Terminal Cistern

5. T-System (Transverse Tubular System)

6. Triad

    a. T-tubule

    b. Terminal Cistern

7. Myofibrils

    a. Thick Myofilaments (Myosin)

    b. Thin Myofilaments

        (1) Actin

        (2) Tropomyosin

        (3) Troponin

8. Sarcomere

    a. Z Line

    b. A (Anisotropic) Band

    c. I (Isotropic) Band

    d. H Zone

    e. M Line

B. Endomysium

C. Fasciculi (Fascicles)

D. Perimysium

E. Epimysium

F. Types of Muscle Fibers

1. Type I (Red Slow Twitch)

2. Type IIA (Intermediate Fast Twitch)

3. Type IIB (White Fast Twitch)

II. Organization of a Skeletal Muscle

A. Fascia

1. Superficial (Subcutaneous) Fascia

2. Deep Fascia

a. Fascial Compartments

b. Bursae

c. Tendon Sheaths

B. Blood Supply of Skeletal Muscles

C. Nerve Supply of Skeletai Muscles

1. Innervation

a. Sensory (Afferent) Nerve Fiber (Neuron)

(1) Neuromuscular Spindles

(2) Golgi Tendon Organs

b. Motor (Efferent) Nerve Fiber (Neuron)

2. Motor Unit

3. Neuromuscular (Myoneural) Junction

a. Nerve Fiber (Axon) Terminal (Synaptic End Bulb)

b. Synaptic Vesicles

c. Synaptic Cleft

d. Motor End Plate

D. Forms and Attachments of Skeletal Muscles

1. Structural Types of Muscles

a. Parallel

b. Fusiform

c. Oblique (Pennate)

(1) Unipennate

(2) Bipennate

(3) Multipennate

d. Triangular (Convergent)

e. Circular

1. Attachments of Muscles

a. Belly

b. Origin

c. Insertion

d. Tendon

e. Aponeurosis

E. Group Actions of Muscles

1. Prime Movers (Agonists)

2. Antagonists

3. Synergists

4. Fixators

F. Naming of Muscles

1. Location

2. Direction

3. Action

4. Shape

5. Number of Divisions

6. Points of Attachment

7. Size

III. Principal Skeletal Muscles

A. Muscles of the Head

1. Muscles of Facial Expression

a. Epicranius

(1) Frontalis

(2) Galea Aponeurotica

(3) Occipitalis

b. Orbicularis Oculi

c. Corrugator Supercilli

d. Levator Palpebrae Superioris

e. Orbicularis Oris

f. Levator Labii Superioris

g. Buccinator

h. Platysma

2. Muscles of Mastication

a. Temporalis

b. "Mandibular Sling"

(1) Masseter

(2) Medial (Internal) Pterygoid

c. Lateral (External) Pterygoid

B. Muscles of the Neck

1. Lateral Cervical Muscles

a. Trapezius

b. Sternocleidomastoid

2. Suprahyoid Muscles

a. Digastric

b. Stylohyoid

c. Mylohyoid

d. Geniohyoid

3. Infrahyoid Muscles

a. Sternohyoid

b. Thyrohyoid

c. Omohyoid

4. Triangles of the Neck

C. Muscles That Move the Vertebral Column

1. Anterior Scalene

2. Middle Scalene

3. Posterior Scalene

4. Splenius Group

5. Erector Spinae (Sacrospinalis) Group

6. Transversospinalis group

7. Interspinalis

8. Intertransversarii

D. Muscles of the Thorax

1. External Intercostal
2. Internal Intercostal
3. Subcostal
4. Transverse Thoracic
5. Serratus Posterior
6. Diaphragm
    a. Origins
    b. Central Tendon
    c. Foramina (Openings)

E. Muscles of the Abdominal Wall

1. Linea Alba
2. External Abdominal Oblique
3. Internal Abdominal Oblique
4. Transverse Abdominal
5. Rectus Abdominis
6. Quadratus lumborum

F. Muscles of the Pelvic Floor and Perineum

1. Levator Ani
2. Coccygeus
3. Bulbocavernosus (Bulbospongiosus)
4. Ischiocavernosus

5. Superficial Transverse Perineus

6. Deep Transverse Perineus

7. Urethral Sphincter

8. External Anal Sphincter

G. Muscles of the Upper Limb

1. Muscles That Move the Shoulder Girdle

a. Anterior Muscles

(1) Pectoralis Minor

(2) Serratus Anterior

(3) Subclavius

b. Posterior Muscles

(1) Trapezius

(2) Rhomboid Major

(3) Rhomboid Minor

(4) Levator Scapulae

2. Muscles That Move the Arm

a. Pectoralis Major

b. Latissimus Dorsi

c. Deltoid

d. Teres Major

e. "SITS" Muscles

(1) Supraspinatus

(2) Infraspinatus

(3) Teres Minor

(4) Subscapularis

f. Coracobrachialis

3. Muscles That Move the Forearm

a. Biceps Brachii

b. Brachialis

c. Brachioradialis

d. Triceps Brachii

e. Pronator Teres

f. Pronator Quadratus

4. Muscles That Move the Wrist, Hands, and Fingers

a. Flexor Carpi Radialis

b. Flexor Carpi Ulnaris

c. Palmaris Longus

d. Flexor Digitorum Profundus

e. Flexor Pollicis Longus

f. Extensor Carpi Radialis Longus

g. Extensor Carpi Ulnaris

h. Extensor Digitorum

i. Extensor Digiti Minimi

j. Abductor Pollicis Longus

l. Extensor Pollicis Brevis

m. Extensor Pollicis Longus

n. Extensor Indicis

o. Flexor Retinaculum

p. Extensor Retinaculum

q. Tendon Sheath

5. Intrinsic Muscles of the Hand

a. Thenar Muscles

b. Hypothenar Muscles

c. Intermediate Muscles

H. Muscles of the Lower Limb

1. Muscles That Move the Thigh

a. Iliopsoas

(1) Iliacus

(2) Psoas Major

b. Gluteus Maximus

c. Gluteus Medius

d. Gluteus Minimus

e. Piriformis

f. Obturator Internus

g. Obturator Externus

h. Tensor Fasciae Latae

i. Quadratus Femoris

2. Muscles That Act on the Leg

a. Anterior (Extensor) Muscles

(1) Sartorius

(2) Quadriceps Femoris

(a) Rectus Femoris

(b) Vastus Lateralis

(c) Vastus Medialis

(d) Vastus Intermedius

b. Medial (Abductor) Muscles

(1) Gracilis

(2) Adductor Longus

(3) Adductor Brevis

(4) Adductor Magnus

(5) Pectineus

c. Posterior (Flexor) Muscles - Hamstrings

(1) Biceps Femoris

(2) Semitendinosus

(3) Semimembranosus

3. Muscles of the Leg

a. Anterior Crural Muscles

(1) Tibialis Anterior

(2) Extensor Hallucis Longus

(3) Extensor Digitorum Longus

b. Posterior Crural Muscles

(1) Gastrocnemius

(2) Soleus

(3) Popliteus

(4) Flexor Hallucis Longus

(5) Flexor Digitorum Longus

(6) Tibialis Posterior

c. Lateral Crural Muscles

(1) Peroneus Longus

(2) Peroneus Brevis

4. Intrinsic Muscles of the Foot

a. Extensor Digitorum Brevis

b. Plantar Muscles

NERVOUS SYSTEM

OBJECTIVES:

1. Describe the organization of the nervous system to include the general plan of organization and the microscopic anatomy.

2. Describe the microscopic anatomy of the nervous system to include the types of cells, the types of neuroglia, and the structure and classification of neurons.

3. Given a model or diagram of a neuron, identify each part and state the function of each part.

4. Discuss the structure of a nerve and the classification of nerve fibers.

5. Given a model or diagram of a nerve, identify each of its components.

6. Describe the following structures of the nervous system: tract, nucleus, ganglion, gray matter, and white matter.

7. Describe the structure of a synapse and of a reflex arc.

8. Given a model or diagram of a synapse or a reflex arc, identify each component.

9. Discuss the anatomy of the spinal cord to include its surface anatomy and its cross sectional anatomy.

10. Given a model or diagram of a cross section of the spinal cord, identify each of its components.

11. Name and describe the protection and coverings of the brain and the spinal cord.

12. Discuss the ventricular system to include the name and description of each of its parts.

13. Discuss the anatomy of the brain to include the names and description of the major parts of the brain, the surface anatomy and the internal anatomy of each part, and the names and descriptions of the components of each part.

14. Given a specimen, model, or diagram of the brain, identify each of its parts.

15. Discuss the sensory and motor neural pathways of the central nervous system to include the types of neurons and the tracts found in each pathway.

16. Name and describe the cranial nerves.

17. Discuss the spinal nerves to include their structural plan and classification.

18. Describe the peripheral branches of the spinal nerve plexuses to include the name of each of the principal nerves, the plexus from which it arises, the major branches of each nerve, and the area(s) innervated by each nerve.

19. Given a specimen, model, or diagram of the peripheral nervous system, identify each of the plexuses and each of the nerves.

20. Discuss the autonomic nervous system to include its divisions, its structural plan, and the functions of each division.

21. Given a specimen, model, or diagram of the nervous system, identify each of its components.

REFERENCE: Tortora and Grabowski, Chapter 12, pages 378-387; Chapters 13 and 14; Chapter 15, pages 485-502; Chapter 17.

Class Outline

I. Organization of the Nervous System

A. General Plan

1. Central Nervous System (CNS)

a. Brain

b. Spinal Cord

2. Peripheral Nervous System (PNS)

a. Cranial Nerves

b. Spinal Nerves

c. Autonomic Nervous System (ANS)

(1) Sympathetic Division

(2) Parasympathetic Division

B. Microscopic Anatomy

1. Neuroglia (Glial Cells)

a. Astroglia (Astrocytes)

b. Oligodendroglia (Oligodendrocytes)

c. Microglia

d. Ependyma

e. Neurolemmocytes (Schwann Cells)

f. Satellite Cells

2. Neurons

a. Structure of a Neuron

(1) Cell Body (Perikaryon)

(2) Neuronal Processes

(a) Dendrites

(b) Axon

1 Axon Hillock

2 Collaterals

3 Axon Terminal (Telodendria)

a Synaptic End Bulbs

b Synaptic Vesicles

b. Myelinated Fibers

(1) Myelin Sheath

(2) Neurolemmocyte (Schwann Cell)

(3) Neurolemma

(4) Neurofibral Node (of Ranvier)

(5) Internode

c. Classification of Neurons

(1) Structural Classification

(a) Multipolar

(b) Bipolar

(c) Unipolar

(2) Functional Classification

(a) Sensory (Afferent) Neuron

(b) Motor (Efferent) Neuron

(c) Association (Connecting; Internuncial) Neuron

C. Macroscopic Anatomy

1. Nerve

a. Structure of a Nerve

(1) Nerve Fibers

(2) Endoneurium

(3) Fasciculi (Bundles)

(4) Perineurium

(5) Epineurium

b. Classification of Nerve Fibers

(1) General Somatic Afferent Fibers

(2) General Somatic Efferent Fibers

(3) General Visceral Afferent Fibers

(4) General Visceral Efferent (Autonomic) Fibers

2. Tract

3. Nucleus (Nerve Center)

4. Ganglion

   a. Sensory Ganglia

   b. Autonomic Ganglia

5. Gray Matter (Substance)

6. White Matter (Substance)

7. Synapse

   a. Presynaptic Neuron

      (1) End Bulb (Terminal Bouton)

      (2) Synaptic Vesicles

      (3) Presynaptic Membrane

   b. Synaptic Cleft

   c. Postsynaptic Neuron

      (1) Postsynaptic Membrane

      (2) Neurotransmitter Receptors

8. Reflex Arc

   a. Receptor

   b. Sensory (Afferent) Neuron

   c. Association Neuron

   d. Motor (Efferent) Neuron

   e. Effector

II. Central Nervous System

A. Protection and Coverings

1. Bony Coverings

a. Cranium

b. Vertebral Column

2. Meninges

a. Dura Mater

(1) Cranial Dura Mater

(a) Falx Cerebri

(b) Tentorium Cerebelli

(c) Falx Cerebelli

(d) Diaphragma Sellae

(e) Venous Sinuses

(f) Sensory Nerve Fibers

(2) Spinal Dura Mater

(a) Epidural Cavity

(b) Coccygeal Ligament

b. Subdural Space

c. Arachnoid (membrane) Mater

(1) Arachnoid Villi

(2) Arachnoid Trabeculae

d. Subarachnoid Space

(1) Cerebellomedullary Cistern (Cisterna Magna)

(2) Pontine Cistern

e. Cerebrospinal Fluid

f. Pia Mater

(1) Cranial Pia Mater

(2) Spinal Pia Mater

(a) Linea Splendens

(b) Denticulate Ligaments

(c) Filum Terminale

B. Cavities of the Central Nervous System (Ventricular System)

1. Central Canal (of the Spinal Cord)

2. Ventricles (of the Brain)

a. Fourth Ventricle

(1) Median Aperture (Foramen of Magendie)

(2) Lateral Apertures (Foramina of Luschka)

(3) Cerebral Aqueduct (of Sylvius)

b. Third Ventricle

c. Lateral Ventricles

(1) Interventricular Foramina (of Monro)

(2) Divisions of the Lateral Ventricle

(a) Central Part

(b) Frontal (Anterior) Horn

(c) Occipital (Posterior) Horn

(d) Temporal (Inferior) Horn

d. Choroid Plexus

e. Tela Choroidea

C. Spinal Cord

1. Surface Anatomy of the Spinal Cord

a. Cervical Enlargement

b. Lumbar Enlargement

c. Conus Medullaris

d. Filum Terminale

f. Cauda Equina

g. Spinal Segments (Neuromeres)

h. Fissures and Sulci

(1) Anterior Median Fissure

(2) Posterior Median Sulcus

(3) Anterior Lateral Sulci

(4) Posterior Lateral Sulci

2. Cross Section of the Spinal Cord

a. Central Canal

b. Gray Matter

(1) Gray Commissure

(a) Anterior (Ventral) Commissure

(b) Posterior (Dorsal) Commissure

(2) Gray Columns (Horns)

(a) Anterior (Ventral) Horns

(b) Lateral Horns

(c) Posterior (Dorsal) Horns

c. White Matter

(1) Ventral White Commissure

(2) White Columns (Funiculi)

(a) Anterior (Ventral) Funiculi

(b) Lateral Funiculi

(c) Posterior (Dorsal) Funiculi

(d) Fiber Tracts (Fasciculi)

1 Ascending (Afferent; Sensory) Tracts

2 Descending (Efferent; Motor) Tracts

D. Brain

1. Brain Stem

a. Medulla Oblongata

(1) Fissures and Sulci

(a) Anterior (Ventral) Median Fissure

(b) Posterior (Dorsal) Median Fissure

(2) Surface Anatomy of the Medulla Oblongata

(a) Pyramids

(b) Decussation of the Pyramids

(c) Olive

(d) Gracile Tubercle

(e) Cuneate Tubercle

(f) Fourth Ventricle

(g) Cranial Nerve Roots

(3) Internal Anatomy of the Medulla Oblongata

(a) Nucleus Gracilis

(b) Nucleus Cuneatus

(c) Cranial Nerve Nuclei

(d) Reticular Formation

b. Pons

(1) Basis Pontis (Basal Portion of the Pons)

(2) Cerebellar Peduncles

(3) Fourth Ventricle

(4) Nuclei of the Pons

(5) Reticular Formation

c. Midbrain

(1) Tectum (Roof)

(2) Cerebral Aqueduct (of Sylvius)

(3) Cerebral Peduncles

(4) Cranial Nerve Nuclei

(5) Reticular Formation

2. Cerebellum

a. Peduncles

b. Vermis

c. Hemispheres

d. Fissures

(1) Dorsolateral (Posterolateral) Fissure

(2) Primary Fissure

e. Lobes

(1) Flocculonodular Lobe

(2) Anterior Lobe

(3) Posterior Lobe

f. Layers of the Cerebellum

(1) Cortex - Folia Cerebelli

(2) Medullary Center (Arbor Vitae)

(3) Cerebellar (Central) Nuclei

3. Cerebrum

a. Diencephalon

(1) Thalamus

(a) Medial Geniculate Body (Nucleus)

(b) Lateral Geniculate Body (Nucleus)

(2) Subthalamus (Subthalamic Nucleus)

(3) Epithalamus

(a) Pineal Body (Gland)

(b) Posterior Commissure

(4) Hypothalamus

(a) Optic Chiasma

(b) Mammillary Body

(c) Infundibulum

(d) Pituitary Gland (Hypophysis Cerebri)

(e) Third Ventricle

(f) Nuclei of the Hypothalamus

b. Telencephalon (Cerebral Hemispheres)

(1) Surface Anatomy of the Cerebral Hemispheres (Cortex)

(a) Gyri (Gyrus)

(b) Sulci (Sulcus)

1 Central Sulcus (of Rolando)

2 Lateral Sulcus (Fissure of Sylvius)

3 Parieto-occipital Sulcus

(c) Fissures

1 Longitudinal Fissure

2 Transverse Fissure

(2) Lobes of the Cerebral Hemispheres

(a) Frontal Lobe

1 Precentral Sulcus

2 Precentral Gyrus

3 Olfactory Tract

4 Olfactory Bulb

(b) Parietal Lobe

1 Postcentral Sulcus

2 Postcentral Gyrus

(c) Temporal Lobe

1 Lateral Sulcus

2 Superior Temporal Gyrus

3 Superior Temporal Sulcus

4 Middle Temporal Gyrus

5 Inferior Temporal Sulcus

6 Inferior Temporal Gyrus

(d) Occipital Lobe

(e) Insula

(3) Corpus Callosum

(4) Basal Nuclei (Ganglia)

(a) Corpus Striatum

1 Caudate Nucleus

2 Lentiform Nucleus

a Putamen

b Globus Pallidus

(b) Claustrum

(c) Amygdala (Amygdaloid Body)

(5) Limbic System

(6) White Matter of the Cerebral Cortex

(a) Association Tracts (Arcuate Fibers)

1 Short Association (Arcuate) Fibers

2 Long Association (Arcuate) Fibers

(b) Commissural Tracts (Fibers)

1 Corpus Callosum

2 Anterior Commissure

3 Posterior Commissure

(c) Projection Tracts (Fibers)

1 Internal Capsule

2 Corona Radiata

E. Neural Pathways of the Central Nervous System

1. Afferent (Sensory; Ascending) Pathways

a. Types of Neurons

(1) First Order Neuron

(2) Second Order Neuron

(3) Third Order Neuron

b. Sensory Tracts

(1) Fasciculus Gracilis

(2) Fasciculus Cuneatus

(3) Anterior (Ventral) Spinothalamic Tract

(4) Lateral Spinothalamic Tract

(5) Anterior (Ventral) Spinocerebellar Tract

(6) Posterior (Dorsal) Spinocerebellar Tract

2. Efferent (Motor; Descending) Pathways

a. Types of Neurons

(1) Upper Efferent (Motor) Neuron

(2) Lower Efferent (Motor) Neuron (Final Common Pathway)

b. Motor Tracts

(1) Corticospinal (Cerebrospinal; Pyramidal) Tracts

(2) Extrapyramidal System (Tracts)

3. Lemniscus Systems

III. Peripheral Nervous System

A. Cranial Nerves

1. Functional Classification of Cranial Nerves

a. Sensory Nerve

b. Motor Nerve

c. Mixed Nerve

2. Description of the Cranial Nerves

a. Olfactory Nerve (I)

b. Optic Nerve (II)

(1) Optic Chiasma

(2) Optic Tract

c. Oculomotor Nerve (III)

d. Trochlear Nerve (IV)

e. Trigeminal Nerve (V)

(1) Trigeminal (Semilunar; Gasserian) Ganglion

(2) Ophthalmic Nerve

(3) Maxillary (Superior Maxillary) Nerve

(4) Mandibular (Inferior Maxillary) Nerve

f. Abducens Nerve (VI)

g. Facial Nerve (VII)

(1) Nerve to the Stapedius Muscle

(2) Chorda Tympani Nerve

(3) Parotid Plexus

h. Vestibulocochlear (Auditory; Acoustic) Nerve (VIII)

(1) Cochlear Nerve

(2) Vestibular Nerve

i. Glossopharyngeal Nerve (IX)

(1) Tympanic Nerve

(2) Carotid Sinus Nerve

j. Vagus Nerve (X)

k. Accessory (Spinal Accessory) Nerve (XI)

l. Hypoglossal Nerve (XII)

B. Spinal Nerves

1. Structural Plan of Spinal Nerves

a. Roots

(1) Dorsal (Posterior; Sensory) Root

(2) Ventral (Anterior; Motor) Root

b. Spinal (Dorsal Root) Ganglion

c. Rami Communicantes

d. Meningeal Branch

e. Primary Divisions (Rami)

(1) Dorsal Ramus

(2) Ventral Ramus

f. Plexuses

(1) Cervical Plexus

(2) Brachial Plexus

(3) Lumbosacral Plexus

(a) Lumbar Plexus

(b) Sacral Plexus

2. Classification of Spinal Nerves

a. Cervical Nerves

b. Thoracic Nerves

c. Lumbar Nerves

d. Sacral Nerves

e. Coccygeal Nerves

3. Peripheral Branches of Spinal Nerve Plexuses

a. Cervical Plexus

(1) Superficial (Cutaneous) Branches

(2) Deep (Muscular) Branches - Phrenic Nerve

b. Brachial Plexus

(1) Axillary Nerve

(2) Musculocutaneous Nerve

(3) Median Nerve

(4) Ulnar Nerve

(5) Radial Nerve

c. Lumbar Plexus

(1) Obturator Nerve

(2) Femoral (Anterior Crural) Nerve

(a) Muscular Branches

(b) Anterior Cutaneous Branches

(c) Saphenous Nerve

d. Sacral Plexus

(1) Superior Gluteal Nerve

(2) Inferior Gluteal Nerve

(3) Sciatic Nerve

(a) Tibial (Medial Popliteal) Nerve

(b) Common Peroneal (Lateral Popliteal) Nerve

1 Superficial Peroneal (Musculocutaneous) Nerve

2 Deep Peroneal (Anterior Tibial) Nerve

(4) Pudendal Nerve

(a) Inferior Rectal (Hemorrhoidal) Nerve

(b) Perineal Nerve

4. Intercostal (Thoracic) Nerves

IV. Autonomic Nervous System

A. Divisions of the Autonomic Nervous System

1. Sympathetic Division

2. Parasympathetic Division

B. Structural Plan of the Autonomic Nervous System

1. Preganglionic Neurons
    a. Sympathetic Preganglionic Neurons
    b. Parasympathetic Preganglionic Neurons
2. Autonomic Ganglia
    a. Sympathetic Ganglia
        (1) Sympathetic Trunk (Central; Chain) Ganglia
        (2) Collateral Ganglia
            (a) Celiac (Semilunar) Ganglion
            (b) Superior Mesenteric Ganglion
            (c) Inferior Mesenteric Ganglion
    b. Parasympathetic (Terminal) Ganglia
        (1) Ciliary Ganglion
        (2) Submandibular Ganglion
        (3) Pterygopalatine Ganglion
        (4) Otic Ganglion
3. Postganglionic Neurons
    a. Sympathetic Postganglionic Neuron
    b. Parasympathetic Postganglionic Neuron
4. Autonomic Plexuses
    a. Cardiac Plexus
    b. Celiac (Solar) Plexus
    c. Pelvic Plexus

EYE AND EAR

OBJECTIVES:

1. Describe the orbit of the eye to include the names of the component bones and the location of each bone in the orbit.

2. Describe the structure of the eyeball to include the name and components of each layer and the function of each component.

3. Discuss the refractory media of the eyeball.

4. Describe the anatomy of the retina.

5. Discuss the accessory structures of the eye to include the name, location, anatomical organization, and function of each structure.

6. Describe the innervation of the eyeball and the accessory structures of the eye.

7. Given a specimen, model, or diagram of the eye, identify each of the layers and components of the eyeball and each of the accessory structures of the eye.

8. Describe the structure of the ear to include the name and components of each part, and the function of each component.

9. Describe the components of the external ear and the tympanic membrane.

10. Describe the components and connections of the middle ear.

11. Describe the structure of the cochlea, vestibule, and semicircular canals.

12. Discuss the labyrinth to include both the bony and membranous components.

13. Describe the innervation of the ear.

14. Given a specimen, model, or diagram of the ear, identify each of the parts of the ear and the components of each part.

REFERENCE: Tortora and Grabowski, Chapter 16, pages 516-547.

Anatomy of the Human Eye; A Programmed Text

Class Outline

I. Eye

A. Orbit

1. Function of the Orbit

2. Shape of the Orbit

3. Bones of the Orbit

a. Frontal Bone

b. Ethmoid Bone

c. Lacrimal Bone

d. Sphenoid Bone

e. Zygomatic Bone

f. Maxilla

B. Accessory Structures of the Eye

1. Eyebrows (Supercilia)

2. Eyelids (Palpebrae)

a. Structure of the Eyelids

(1) Skin

(2) Connective Tissue

(3) Tarsus

(a) Tarsal Plates

(b) Tarsal (Meibomian) Glands

(4) Muscles

(a) Levator Palpebrae Superioris

(b) Orbicularis Oculi

(5) Conjunctiva

(a) Palpebral Conjunctiva

(b) Bulbar Conjunctiva

b. Palpebral Fissure

c. Palpebral Commissures (Canthi)

(1) Lateral Commissure (Canthus)

(2) Medial Commissure (Canthus)

d. Lacrimal Caruncle

3. Eyelashes (Cilia)

4. Lacrimal Apparatus

a. Lacrimal Gland

b. Lacrimal Ducts

c. Lacrimal Canals (Canaliculi)

(1) Superior

(2) Inferior

d. Lacrimal Sac

e. Nasolacrimal Duct

B. Eyeball

1. Fibrous Tunic

a. Sclera

b. Cornea

2. Vascular Tunic

a. Choroid

b. Ciliary Body

(1) Ciliary Processes

(2) Ciliary Muscles

c. Iris

(1) Pupil

(2) Muscles

(a) Sphincter Pupillae

(b) Dilator Pupillae

(3) Anterior Chamber

(4) Posterior Chamber

3. Nervous Tunic (Retina)

a. Layers of the Retina

(1) Photoreceptor Cells

(a) Rods

(b) Cones

(2) Bipolar Cells

(3) Ganglion Cells

b. Macula Lutea and Fovea Centralis

c. Optic Disc

4. Refractory Media

a. Cornea

b. Aqueous Humor

c. Crystalline Lens

(1) Suspensory Ligaments

(2) Anterior Cavity

(3) Posterior Cavity

d. Vitreous Body

5. Ocular Muscles

a. Recti Muscles

(1) Superior Rectus

(2) Inferior Rectus

(3) Medial Rectus

(4) Lateral Rectus

b. Oblique Muscles

(1) Superior Oblique

(2) Inferior Oblique

6. Innervation and Blood Supply

a. Optic Nerve

(1) Optic Chiasma

(2) Lateral Geniculate Nucleus

(3) Optic Radiations

(4) Visual Cortex (Occipital Lobe)

b. Oculomotor Nerve

c. Trochlear Nerve

d. Abducens Nerve

e. Ophthalmic Artery

II. Ear

A. External Ear

1. Auricle (Pinna)

2. External Auditory Canal

3. Ceruminous Glands

4. Tympanic Membrane

B. Middle Ear

1. Ossicles

a. Malleus

b. Incus

c. Stapes

2. Muscles

a. Tensor Tympani

b. Stapedius

3. Auditory (Eustachian) Tube

4. Mastoid Antrum

5. Oval Window

6. Round Window

C. Inner Ear

1. Osseous (Bony) Labyrinth

a. Vestibule

b. Semicircular Canals

c. Cochlea

(1) Modiolus

(2) Basilar Membrane

(a) Scala Vestibuli

(b) Scala Tympani

d. Perilymph

2. Membranous Labyrinth

a. Utricle

b. Saccule

c. Semicircular Ducts

d. Cochlear Duct

(1) Tentorial Membrane

(2) Spiral Organ (of Corti)

e. Endolymph

3. Vestibulocochlear Nerve

RESPIRATORY SYSTEM

OBJECTIVES:

1. Discuss the anatomy of the upper respiratory tract to include the name of each of the major divisions and a description of the structure of each division.

2. Discuss the anatomy of the mediastinum to include the name of each of the major structures contained therein and the relationships of each of the major structures.

3. Describe the anatomical relationships of the lungs.

4. Describe the pattern of branching of the bronchotracheal tree.

5. Discuss the concept of pulmonary segments to include the location of the various segments.

6. Given a model or diagram of a lung lobule, identify each of its parts.

7. Discuss the pulmonary blood supply to include the nutritive blood supply and the functional blood supply.

8. Given a specimen, model, or diagram of the respiratory system or the lungs, identify each of the structures or component parts.

REFERENCE: Tortora and Grabowski, Chapter 23, pages 775-790.

Class Outline

I. Upper Respiratory Tract

   A. Nose

      1. External Nose

         a. External (Anterior) Nares

         b. Vibrissae

         c. Bony Framework

         d. Cartilaginous Framework

2. Nasal Cavity

a. Septum

(1) Ethmoid Bone

(2) Vomer Bone

(3) Cartilage

b. Nasal Fossae

(1) Conchae

(2) Meatuses

(3) Mucous Membrane

(a) Respiratory Region

(b) Olfactory Region

c. Internal Nares (Choanae)

3. Paranasal Sinuses

a. Frontal Sinuses

b. Ethmoidal Air Cells

c. Sphenoidal Sinuses

d. Maxillary Sinus

B. Pharynx

1. Nasopharynx

a. Auditory (Eustachian) Tube

b. Pharyngeal Tonsil (Adenoids)

2. Oropharynx

3. Laryngopharynx

4. Muscles of the Pharynx

C. Larynx

1. Cartilages

a. Thyroid Cartilage

b. Cricoid Cartilage

c. Arytenoid Cartilages

d. Corniculate Cartilages

e. Cuneiform Cartilages

f. Epiglottis

2. Ligaments

a. Extrinsic Ligaments

b. Intrinsic Ligaments

3. Muscles

a. Extrinsic Muscles

b. Intrinsic Muscles

4. Laryngeal Cavity

a. Ventricular Folds

b. Vocal Folds

c. Glottis

d. Ventricle

D. Trachea

1. Cartilages

2. Trachealis Muscle

3. Carina

E. Bronchi

1. Primary Bronchi

2. Secondary (lobar) Bronchi

3. Tertiary (Segmental) Bronchi

F. Mediastinum

G. Pleura

a. Parietal Pleura

b. Visceral Pleura

c. Pleural Cavity

II. Lungs

A. Surfaces and Borders

B. Lobes and Fissures

1. Right Lung

2. Left Lung

C. Bronchopulmonary Segments

1. Primary Bronchi

2. Secondary (Lobar) Bronchi

3. Tertiary (Segmental) Bronchi

a. Right Lung

b. Left Lung

4. Bronchioles

5. Terminal Bronchioles

D. Lobule (Acinus)

1. Terminal Bronchiole
2. Respiratory Bronchioles
3. Alveolar Ducts
4. Atria
5. Alveolar Sacs
6. Alveoli

E. Blood Supply

1. Pulmonary (Functional) Blood Supply
   a. Pulmonary Arteries
   b. Pulmonary Veins
2. Systemic (Nutritive) Blood Supply
   a. Bronchial Arteries
   b. Bronchial Veins

BLOOD

OBJECTIVES:

1. Discuss the composition of blood to include the name and description of each of the components.
2. Discuss the production and fate of each of the formed elements of blood.
3. Given a slide or illustration of blood, identify the components of blood.

REFERENCE: Tortora and Grabowski, Chapter 19, pages 610-622.

Class Outline

I. Functions of Blood

II. Composition of Blood

- A. Plasma
  - 1. Water
  - 2. Electrolytes
  - 3. Proteins
- B. Formed Elements
  - 1. Erythrocytes
  - 2. Leucocytes
    - a. Granulocytes
      - (1) Neutrophils
      - (2) Basophils
      - (3) Eosinophils
    - b. Agranulocytes

(1) Lymphocytes

(2) Monocytes

3. Thrombocytes

CARDIOVASCULAR SYSTEM

ÒBJECTIVES:

1. Describe the location and anatomical relationships of the heart.
2. Describe the structure of the heart wall.
3. Describe the structure and anatomical relationships of the chambers and valves of the heart.
4. Describe the pattern of blood flow through the heart.
5. Discuss the internal conduction system of the heart.
6. Discuss the cardiac blood supply to include the name of each vessel and area of the heart that it serves.
7. Given a specimen, model, or diagram of a heart, identify each of its parts.
8. Discuss the anatomy of the blood vasculature to include the name, function and structure of each vessel type, the blood supply and innervation.
9. Describe the major blood circuits of the body.
10. Discuss the major blood vessels of the body to include the name of each artery or vein, its origin and termination, and the area(s) that it serves.
11. Given a specimen, model, or diagram of the body, identify each of the major arteries and veins and the area(s) which each serves.

REFERENCE: Tortora and Grabowski, Chapter 20, pages 636-654; Chapter 21, pages 670-676 and 689-738.

Class Outline

I. Functions of the Cardiovascular System

II. Anatomy of the Cardiovascular System

  A. Heart

    1. Mediastinum

2. Pericardial Sac
    a. Fibrous Pericardium
    b. Parietal Pericardium
3. Heart Wall
    a. Epicardium (Visceral Pericardium)
    b. Myocardium
    c. Endocardium
4. Heart Chambers
    a. Atria
        (1) Right Atrium
        (2) Left Atrium
    b. Ventricles
        (1) Right Ventricle
        (2) Left Ventricle
5. Heart Valves
    a. Atrioventricular Valves
        (1) Tricuspid
        (2) Bicuspid (Mitral)
        (3) Chordae Tendineae
        (4) Papillary Muscles
    b. Semilunar Valves
        (1) Pulmonary Valve
        (2) Aortic Valve

6. Pattern of Blood Flow Through the Heart

7. Cardiac Skeleton

8. Internal Conduction System of the Heart

    a. Sinoatrial (SA) Node

    b. Atrioventricular (AV) Node

    c. Atrioventricular Bundle (Bundle of His)

    d. Bundle Branches

    e. Purkinje Fibers

9. Cardiac Blood Supply

    a. Right Coronary Artery

        (1) Posterior Interventricular (Descending) Artery

        (2) Marginal Artery

    b. Left Coronary Artery

        (1) Anterior Interventricular (Descending) Artery

        (2) Circumflex Artery

    c. Cardiac Veins

        (1) Great Cardiac Vein

        (2) Small Cardiac Vein

        (3) Middle Cardiac Vein

    d. Coronary Sinus

    e. Anterior Cardiac Vein

B. Vasculature

1. Vessel Types

a. Arteries

b. Veins

c. Capillaries

2. Vessel Structure

a. Wall

(1) Tunica Externa

(2) Tunica Media

(3) Tunica Interna

b. Blood Supply

c. Innervation

3. Blood Circuits

a. Pulmonary Circulation

b. Systemic Circulation

c. Coronary Circulation

4. Arteries of the Body

a. Aorta

(1) Ascending Aorta

(2) Aortic Arch

(a) Brachiocephalic Artery

1 Right Common Carotid Artery

2 Right Subclavian Artery

a Right Vertebral Artery

b Right Internal Thoracic (Mammary) Artery

(b) Left Common Carotid Artery

(c) Left Subclavian Artery

1 Left Vertebral Artery

2 Left Internal Thoracic (Mammary) Artery

(3) Descending Aorta

(a) Thoracic Aorta

1 Intercostal Arteries

2 Bronchial Arteries

3 Superior Phrenic Arteries

4 Esophageal Arteries

(b) Abdominal Aorta

1 Inferior Phrenic Arteries

2 Celiac Trunk (Artery)

a Common Hepatic Artery

b Left Gastric Artery

c Splenic Artery

3 Superior Mesenteric Artery

4 Renal Arteries

5 Testicular (Ovarian) Arteries

6 Inferior Mesenteric Artery

7 Common Iliac Arteries

a External Iliac Arteries

b Internal Iliac Arteries

b. Arteries of the Head and Neck

(1) Common Carotid Arteries

(a) External Carotid Arteries

(b) Internal Carotid Arteries

1 Anterior Cerebral Arteries

2 Middle Cerebral Arteries

(2) Vertebral Arteries

(a) Basilar Artery

(b) Posterior Cerebral Arteries

(3) Cerebral Arterial Circle (Circle of Willis)

c. Arteries of the Upper Limb

(1) Subclavian Arteries

(2) Axillary Arteries

(3) Brachial Arteries

(a) Radial Arteries

(b) Ulnar Arteries

(c) Palmar Arches

d. Arteries of the Lower Limb

(1) External Iliac Arteries

(2) Femoral Arteries

(3) Popliteal Arteries

(a) Anterior Tibial Arteries

1 Malleolar arteries

2 Dorsalis Pedis

(b) Posterior Tibial Arteries

1 Peroneal Arteries

2 Plantar Arteries

5. Veins of the Body

a. Types of Venous Channels

(1) Superficial Veins

(2) Deep Veins

(3) Venous Sinuses

b. Superior Vena Cava

(1) Brachiocephalic Veins

(a) Internal Jugular veins

(b) Subclavian Veins

(2) Veins of the Head and Neck

(a) Internal Jugular Veins

(b) External Jugular Veins

(c) Vertebral Veins

(3) Veins of the Upper Limb

(a) Superficial Veins

1 Cephalic Veins

2 Basilic Veins

3 Median Antebrachial Veins

4 Dorsal Venous Arch

5 Palmar Venous Arch

(b) Deep Veins

1 Axillary Veins

2 Brachial Veins

3 Radial Veins

4 Ulnar Veins

5 Deep Palmar Veins

(4) Veins of the Thorax and Abdomen

(a) Azygos Vein

(b) Hemiazygos Vein

(c) Internal Thoracic Veins

(d) Internal Intercostal Veins

(e) Bronchial Veins

(f) Vertebral Plexuses

c. Inferior Vena Cava

(1) Lumbar Veins

(2) Testicular (Ovarian) Veins

(3) Renal Veins

(4) Suprarenal Veins

(5) Hepatic Veins

(6) Inferior Phrenic Veins

(7) Hepatic Portal System

(a) Splenic Vein

1 Pancreatic Veins

2 Inferior Mesenteric Vein

(b) Superior Mesenteric Vein

(c) Left Gastric Vein

(d) Right Gastric Vein

(e) Cystic Veins

(8) Common Iliac Veins

(a) External Iliac Veins

(b) Internal Iliac Veins

(9) Veins of the Lower Limb

(a) Superficial Veins

1 Great Saphenous Vein

2 Small Saphenous Vein

(b) Deep Veins

1 Plantar Venous Arch

2 Posterior Tibial Veins

a Medial Plantar Veins

b Lateral Plantar Veins

c Peroneal Veins

3 Anterior Tibial Veins

4 Popliteal Vein

5 Femoral Vein

LYMPHATIC SYSTEM

OBJECTIVES:

1. Discuss the organization of the lymphatic system to include the name, location, and function of each of the major components of the lymphatic pathways.

2. Name and describe each of the major lymphatic organs to include the location and function of each.

3. Discuss the mononuclear phagocyte system.

4. Given a specimen, model, or diagram of the body, identify each of the major lymphatic pathways and lymphatic organs and the area(s) which each serves.

REFERENCE: Tortora and Grabowski, Chapter 22, pages 738-747.

Class Outline

I. Functions of the Lymphatic System

II. Organization of the Lymphatic System

- A. Lymphatic Pathways
  - 1. Lymphatic Capillaries
  - 2. Collecting Lymphatic Vessels
  - 3. Lymphatic Trunks
  - 4. Lymphatic Ducts
    - a. Thoracic Duct
    - b. Right Lymphatic Duct
- B. Lymphatic Organs
  - 1. Lymph Nodes

2. Spleen

a. Functions of the Spleen

b. Anatomical Relationships of the Spleen

c. Structure of the Spleen

3. Thymus

4. Tonsils

III. Mononuclear Phagocyte System

A. Fixed Macrophages

B. Wandering Macrophages

DIGESTIVE SYSTEM

OBJECTIVES:

1. Describe the organization of the digestive system to include the divisions of the system and the structure of the gastrointestinal tract.

2. Name the organs of the gastrointestinal tract and describe the anatomy of each organ.

3. Name the accessory organs of the gastrointestinal tract and describe the macroscopic and microscopic anatomy of each organ.

4. Discuss the anatomical relationships among the pancreas, liver, duodenum, and the hepatopancreatic ducts.

5. Given a model or diagram of a liver lobule, identify each of its parts.

6. Discuss the anatomy of the abdomen to include its boundaries and apertures, and the peritoneal membranes and their various modifications.

7. Given a specimen, model, or diagram of the body or the digestive system, identify each of the parts of the digestive system.

REFERENCE: Tortora and Grabowski, Chapter 24.

Class Outline

I. Organization of the Digestive System

   A. Divisions of the Digestive System

      1. Gastrointestinal Tract (Alimentary Canal)

      2. Accessory Organs

   B. Structure of the Gastrointestinal Tract

      1. Mucosa

      2. Submucosa

      3. Muscularis

4. Serosa

II. Organs of the Gastrointestinal Tract

A. Mouth

1. Vestibule

a. Orifice

b. Lips

(1) Frenulum

(2) Labial Glands

(3) Orbicularis Oris Muscle

c. Cheeks

(1) Buccal Glands

(2) Parotid Papilla (Duct)

(3) Buccinator Muscle

2. Oral Cavity Proper

a. Gums (Gingivae)

b. Palate

(1) Hard Palate

(2) Soft Palate

(a) Uvula

(b) Palatine Arches

1 Palatoglossal Arch

2 Palatopharyngeal Arch

c. Palatine Tonsils

d. Tongue

(1) Papillae

(2) Muscles

(a) Extrinsic Muscles

(b) Intrinsic Muscles

e. Fauces

B. Pharynx

1. Nasopharynx

2. Oropharynx

3. Laryngopharynx

C. Esophagus

D. Stomach

1. Curves

a. Greater Curvature

b. Lesser Curvature

2. Regions

a. Cardia

b. Fundus

c. Body

d. Pylorus

3. Cardiac Orifice

4. Rugae

5. Gastric Glands

a. Chief Cells

b. Parietal Cells

6. Pyloric Sphincter

E. Small Intestine

1. Regions

a. Duodenum

b. Jejunum

c. Ileum

2. Intestinal Structure

a. Circular Folds

b. Villi

c. Duodenal Papilla

d. Duodenal (Brunner's) Glands

e. Intestinal Glands

f. Intestinal Tonsils (Peyer's Patches)

g. Ileocecal Valve

F. Large Intestine

1. Cecum - Vermiform Appendix

2. Colon

a. Ascending Colon

b. Right Colic (Hepatic) Flexure

c. Transverse Colon

d. Left Colic (Splenic) Flexure

e. Descending Colon

f. Sigmoid Colon

3. Rectum

4. Anal Canal

a. Rectal Columns

b. Internal Sphincter

c. External Anal Sphincter

d. Anus

III. Accessory Organs of the Gastrointestinal Tract

A. Salivary Glands

1. Parotid Glands

2. Submandibular Glands

3. Sublingual Glands

B. Pancreas

1. Divisions

a. Head

b. Neck

c. Body

d. Tail

2. Pancreatic Duct System

a. Pancreatic Duct (of Wirsung)

b. Accessory Pancreatic Duct (of Santorini)

3. Microscopic Anatomy

a. Acini

b. Pancreatic Islets (of Langerhans)

C. Liver and Gallbladder (Biliary System)

1. Liver

a. Lobes

(1) Right Lobe

(a) Quadrate Lobe

(b) Caudate Lobe

(2) Left Lobe

b. Ligaments

(1) Falciform Ligament

(2) Coronary Ligament

(3) Ligamentum Teres (Round Ligament)

c. Lobule

(1) Central (Intralobular) Vein

(2) Hepatic Cells (Hepatocytes)

(3) Sinusoids

(4) Macrophages (Kupffer's Cells)

(5) Bile Capillaries (Canaliculi)

d. Bile Ducts

(1) Bile Capillaries

(2) Interlobular Bile Ducts

(3) Hepatic Ducts

e. Hepatic (Portal) Triad

(1) Bile Duct

(2) Portal Vein

(3) Hepatic Artery

2. Gallbladder

a. Regions of the Gallbladder

b. Rugae

c. Cystic Duct

3. Bile Duct System

a. Hepatic Ducts

(1) Right Hepatic Duct

(2) Left Hepatic Duct

(3) Common Hepatic Duct

b. Cystic Duct

c. Common Bile Duct

d. Hepatopancreatic Ampulla (of Vater)

e. Hepatopancreatic Sphincter (of Oddi)

IV. The Abdomen

A. Boundaries of the Abdomen

B. Apertures into the Abdomen

C. Peritoneum

1. Parietal Peritoneum
2. Visceral Peritoneum
3. Mesenteries
4. Ligaments
5. Omenta
    a. Greater Omentum
    b. Lesser Omentum

URINARY SYSTEM

OBJECTIVES:

1. Discuss the anatomy of the urinary system to include the name, location, relationships, and function of each of its component organs.

2. Describe the structure of the kidney to include its investments, external anatomy, and internal anatomy.

3. Describe the microscopic anatomy of the kidney to include the structure and function of the nephron and each of its parts, the collecting tubule, and the juxtaglomerular apparatus.

4. Describe the pattern of blood flow through the kidney.

5. Describe the structure of the urinary bladder.

6. Given a specimen, model, or diagram of the body, identify each of the organs of the urinary system.

7. Given a specimen, model, or diagram of the kidney, identify each of its component parts.

8. Given a model or diagram of a nephron, identify each of its parts.

REFERENCE: Tortora and Grabowski, Chapter 26, pages 914-924 and 945-955.

Class Outline

I. Kidneys

   A. Investments

      1. Renal Fascia

      2. Perirenal fat (Adipose Capsule)

   B. External Anatomy

      1. Hilus

      2. Renal Sinus

C. Internal Anatomy

1. Renal Capsule
2. Cortex
    a. Cortical Arches
    b. Renal Columns
3. Medulla
    a. Renal Pyramids
    b. Renal papillae
4. Minor Calyces
5. Major Calyces
6. Renal Pelvis

D. Microscopic Structure

1. Nephrons
    a. Renal Corpuscle
        (1) Glomerulus
            (a) Afferent Arteriole
            (b) Efferent Arteriole
        (2) Glomerular (Bowman's) Capsule
    b. Renal Tubule
        (1) Proximal Convoluted Tubule
        (2) Loop of Henle
        (3) Distal Convoluted Tubule
2. Collecting Tubules

3. Juxtaglomerular Apparatus

a. Macula Densa

b. Juxtaglomerular cells

E. Renal Circulation

1. Renal Arteries
2. Segmental Arteries
3. Interlobar Arteries
4. Arcuate Arteries
5. Interlobular Arteries
6. Afferent Arterioles
7. Glomeruli
8. Efferent Arterioles
9. Peritubular Capillaries and Vasa Recta
10. Peritubular Venules
11. Interlobular Veins
12. Arcuate Veins
13. Interlobar Veins
14. Segmental Veins
15. Renal Veins

II. Ureters

III. Urinary Bladder

A. Detrusor Muscle

B. Trigone

C. Internal Sphincter

IV. Urethra

A. Male Urethra

B. Female Urethra

C. External sphincter

REPRODUCTIVE SYSTEM

OBJECTIVES:

1. Discuss the anatomy of the male reproductive system to include the name, location, structure, and function of each organ.

2. Discuss the anatomy of the female reproductive system to include the name, location, structure, and function of each organ.

3. Given a specimen, model, or diagram of the body, identify each of the structures of the male and female reproductive system.

REFERENCE: Tortora and Grabowski, Chapter 28, pages 974-1007.

Class Outline

I. Male Reproductive System

- A. Scrotum
  - 1. Raphe
  - 2. Dartos Tunic
  - 3. External Spermatic Fascia
  - 4. Cremaster Muscle
  - 5. Internal Spermatic Fascia
  - 6. Tunica Vaginalis
- B. Testes
  - 1. Tunica Albuginea
  - 2. Lobules
    - a. Seminiferous Tubules
    - b. Interstitial Cells

3. Vasa Efferentia

C. Epididymides

D. Vasa Deferentia

E. Spermatic Cords

1. Pampiniform Plexus

2. Arteries

3. Vas Deferens

F. Seminal Vesicles

G. Ejaculatory Ducts

H. Prostate Gland

I. Bulbourethral (Cowper's) Glands

J. Urethra

1. Prostatic Urethra

2. Membranous Urethra

3. Cavernous Urethra

K. Penis

1. Corpora Cavernosa

2. Corpus Spongiosum

3. Glans Penis

4. Prepuce

5. Frenulum

6. External urethral orifice

II. Female Reproductive System

A. Internal Organs

1. Ovaries
2. Oviducts (Uterine Tubes)
3. Uterus
    a. Regions of the Uterus
        (1) Fundus
        (2) Body
        (3) Cervix
    b. Layers of the Uterine Wall
        (1) Perimetrium
        (2) Myometrium
        (3) Endometrium
4. Vagina

B. External Organs (Vulva or Pudendum)

1. Mons Pubis
2. Labia Majora
3. Labia Minora
4. Clitoris
5. Vestibule
6. Bulb of the Vestibule
7. Greater Vestibular Glands

C. Mammary Glands

1. Lobes

2. Suspensory (Cooper's) Ligaments
3. Nipple
4. Areola

ENDOCRINE SYSTEM

OBJECTIVES:

1. Compare and contrast the functions of the endocrine system and the nervous system.
2. Compare and contrast an endocrine gland and an exocrine gland.
3. Name the organs of the endocrine system and describe the location, anatomical relationships, and functions of each organ.
4. Given a specimen, model, or diagram of the body, identify each of the endocrine glands.

REFERENCE: Tortora and Grabowski, Chapter 18.

Class Outline

I. Cell-to-Cell Communication
   - A. Nervous System
   - B. Endocrine System
   - C. Glands
     1. Exocrine Gland
     2. Endocrine Gland

II. Organs of the Endocrine System
   - A. Gonads
     1. Testis
     2. Ovary
        - a. Follicle
        - b. Corpus Luteum

B. Pancreas

1. Location

2. Microscopic Anatomy

a. Acini

b. Pancreatic Islets (of Langerhans)

(1) Alpha Cells

(2) Beta Cells

(3) Delta Cells

C. Adrenal Glands

1. Location

2. Structure

a. Adrenal Cortex

b. Adrenal Medulla

D. Thyroid Gland

1. Location

2. Lobes

3. Microscopic Anatomy

a. Follicles

b. Parafollicular Cells

E. Parathyroid Glands

1. Location

2. Microscopic Anatomy - Chief Cells

F. Pituitary Gland (Hypophysis)

1. Anterior Pituitary (Adenohypophysis)
    a. Location
    b. Microscopic Anatomy
        (1) Somatotroph Cells
        (2) Lactotroph Cells
        (3) Corticotroph Cells
        (4) Thyrotroph Cells
        (5) Gonadotroph Cells
    c. Blood Supply
        (1) Superior Hypophyseal Arteries
        (2) Hypophyseal Portal Veins
2. Posterior Pituitary (Neurohypophysis)
    a. Location
    b. Microscopic Anatomy

G. Other Endocrine Structures
1. Hypothalamus
2. Pineal Gland
3. Thymus Gland
4. Gastrointestinal Tract
5. Placenta
6. Kidneys
7. Heart